

objects as may be too heavy for the beeswax). The pane to slide between two grooves into any convenient movable stand. The advantage of this form and arrangement is obvious, as after the object or objects are fixed to the glass they can be inverted or placed sideways, as may best suit the light, without moving the camera. Moreover, the stand can be tilted or set obliquely at the operator's pleasure, the object being thus adjusted to the camera instead of the camera to the object. The backgrounds can of course be changed at will to any shade between black and white—a most important power, as a background that will set off one object will often be unsuitable to another.

Torquay, September 15

ARTHUR R. HUNT

Animal Intelligence

AT the north side of Dublin there is at Clontarf a sea inlet where the water at certain times of the tide is very shallow. A little stream flows under the road into the sea at this place. The bridge beneath which it passes has pretty high parapets. A huge dog, a frequent companion during my student days, used to mount one of these parapets, employing it as a lookout when he happened for the moment to lose sight of me. Mrs. Comerford, widow of a distinguished barrister, was my landlady. This dog, aided by an accomplice named Bran, slew Mrs. Comerford's red cat, a great favourite, and buried him, all but the point of his tail, in the garden. The accomplices demeaned themselves in the most innocent manner, but betrayed considerable confusion when their delinquency was detected. It did not seem to occur to their canine minds that the mere tip of the poor cat's tail, when the body itself was out of sight, could possibly incriminate them. But to return to Clontarf. It was the practice among the lads about, when the depth of water suited, to wade out and catch little flatfish. These abound in great numbers, and lie commonly on the seabed. The waders went in barelegged, and when they happened to tread upon a fish, kept the foot in position until they could stoop down and secure their prey. One of the fisherboys was one day attended by his dog, and when the intelligent creature saw the work in which his master was engaged, proceeded to help him by plunging about, and whenever he felt a fish, kept his paw upon it until his master should come up and place it in his creel. This curious method of catching flatfish is not confined to Clontarf. I was walking one day along Con's Water, called after the old chieftan of the name, Con or Constantine O'Neil, when I observed a barefooted lad wading in the shallow water, for the tide was out, and from time to time casting something on the bank. He was catching flatfish with his feet. I did not detect his occupation, in which he seemed pretty successful, until I went close up in order to see what he was about.

Belfast, September 22

HENRY MACCORMAC

Meteor

It may interest some of your readers to know that a meteor was seen here this evening during a thunderstorm, and immediately after a flash of lightning. It appeared about the size of an ordinary cricket ball, and was of a brilliant yellow colour, and moved very slowly in an upward northerly direction from about east-south-east. As it moved along, it gradually decreased to the size of an ordinary star, and was then lost to my view. The storm began about 7 o'clock, and lasted about half an hour, during which time the lightning was very vivid. A very thick fog (that arose suddenly) preceded the storm, but disappeared before its commencement. The weather during the day had been close, with heavy showers at intervals. C. FORTESCUE

11, Oxford Road, Banbury, September 30

A Remarkable Rainbow

ON Monday, September 24, I saw at Chertsey, in Surrey, a remarkable rainbow. Beyond the blue of the inner bow the colours repeated themselves three times, so that there appeared four contiguous spectra; the three extraordinary ones being narrower and less bright than the ordinary. The outer bow appeared as usual. I am not aware that this phenomenon has been noticed before, and being quite unable to account for its appearance would be greatly obliged to any one who would enlighten me.

Firfield, Weybridge Heath, September 25

L. C.

Professor Cayley

WITH reference to Dr. Salmon's account of Dr. Cayley's undergraduate career it may be worth while to call the attention

of some of the readers of NATURE to a contemporary description in C. A. Bristed's "Five Years in an English University," vol. i. pp. 130-132 (1852). In this volume are also to be found many notices of other Senior Wranglers and Senior Classics of about the above date. R. T.

THE NORDENSKJÖLD GREENLAND EXPEDITION

THE following is an abstract of two communications received from Dr. A. G. Nathorst, dated Upernivik, in Greenland, July 22 and August 2, in which the eminent Swedish naturalist gives an account of the work of the Nordenskjöld expedition up to the latter date:—

Having left Reikiavik on June 10, we sighted the coast of Greenland in lat. 65° 50' on the 12th, but were unable, on account of the pack-ice, to reach the shore. During the following day we steamed along the ice, dredging and making hydrographical measurements with great success, and on the 14th we came very close to the shore in lat. 62° 40', but, as it was impossible to land even here, we made for Julianshaab, *vid* Cape Farewell. From there Nordenskjöld, Herr Kolthoff, and myself made an excursion to Nunasernansak, in the Kongerdluarsuk Fjord, the only spot on the earth where the remarkable mineral "endialyt" is found, and from which the metal known as zirconium is produced. Of this, as well as of other minerals found here, we made an excellent harvest.

Having called at Godhavn, we arrived, on June 29, at Ujaragsugsuk, where Herr Hamberg and I landed in order to examine the fossil plant-bearing strata here, while the vessel proceeded to the Auleitsvik Fjord, whence the ice journey was to commence. On the way north the *Sophia* called at Egedesminde, and on July 1 anchored at Tessiursarsoak, where a splendid harbour was discovered, which was afterwards charted by Sergeant Kjellman under the name of "Sophia Harbour." July 2 and 3 were spent in bringing the baggage for the ice journey up on the ice, and on July 4 Nordenskjöld started in the company of Dr. Berlin, in the finest weather, on his inland excursion.

On July 8 the ship was to have left the harbour to take us on board again, but it was not until four days after that she succeeded in getting out on account of ice. These days were occupied by Dr. Forsstrand and Herr Kolthoff in dredging and in making ornithological, entomological, and botanical collections, a labour which was attended with remarkable success. On the 14th the *Sophia* arrived at Godhavn, where the *Yantic* and *Proteus*, the two American vessels on the way to Smith's Sound for the relief of Lieut. Greely's expedition at Lady Franklin Bay, were lying. Here the well-known Esquimaux interpreter, Hans Hendrik—generally called Hans Christian—who has participated in Arctic expeditions ever since Kane's voyage, joined the vessel, and on the 7th Herr Hamberg and I were taken on board.

The results of our researches at Ujaragsugsuk are *exceedingly* good, and many new discoveries, both geological and palæontological, have been made. The finds made at Atonekerdluk, on the other side of the Waigat, were especially very remarkable and valuable, as a number of hitherto unknown strata bearing fossil plants were discovered, from which magnificent leaves of *Aralia*, *Magnolia*, *Lycasartia*, *Platanæ*, and others were extracted. An idea of the size of the collection made may be gathered from the fact that they fill five large barrels, five boxes, and a firkin, which will all be despatched by a sailing vessel to Copenhagen. On July 22 the *Sophia* left Upernivik for Cape York, where Hans Hendrik says that the iron blocks we desire to examine are really lying. On the way north we found little ice, most of it being "calved" from the glaciers; we encountered, however, much fog, and were often compelled to "lay to," but such time has always been spent in dredging and studying the sea.

Between June 24 and 27 we were cruising in the pack-ice from 74° to $76^{\circ} 5'$ lat., where we sighted Conical Rock. It was, however, impossible to penetrate towards Cape York, but only to the north-west. As we saw a fjord north-east of Conical Rock, which was, however, not marked on the chart, we steered into it and cast anchor. Seeing some human beings on the shore, we landed, and found them to be a couple of Esquimaux families, rude and uncivilised, but obliging. They only stay here in the summer for catching the rotges which breed here in large numbers, while during the winter they sojourn on an island in Wolstenholme Sound, where they hunt the walrus. They possessed, however, no boats. We purchased some of their tools, &c., clothes of birds' skin, and some bear and fox hides.

On July 27 we sent two Esquimaux to examine the ice towards Cape York, who came back and reported that it was still lying along the south-east coast. For four days we attempted to penetrate northwards, running the ship in every direction where we saw a lead, but, as we everywhere encountered the ice barrier and were several times in great danger of being crushed, we "stood about," and arrived at Upernivik on the night of August 1.

It appears thus that the last severe winter in Greenland has also extended up Smith's Sound, as an example of which I may mention that Nares, who on the same day as we, in 1875, steamed up Smith's Sound towards Cape York, found the sea entirely free from ice.

That the chief object of this part of the expedition, while in my command, should not have been realised, I extremely regret; but I console myself with the fact that every effort in human power was done in order to carry it out.

I may say, however, that the exceedingly rich, zoological, botanical, and hydrographical fruits of the expedition towards Cape York and back, fully repay the cost and labour of the voyage. We leave here (August 2) for the Waigat, where I intend continuing my geological researches, while the rest of the expedition on board start on a four day's zoological and hydrographic excursion towards America. When that is over we start for Egedesminde, to take Nordenskjöld on board.

Dr. Berlin, who accompanied Nordenskjöld on his journey on the ice in Greenland, writes as follows:—

On July 3 the march began from the Auleitsvik Fjord. The party consisted of Nordenskjöld, myself, Sergeant Kjellström, the second mate Herr Johannesen, two hunters, Sevalsen and Kræmmer, two sailors, and the Lapps, Anders and Lars. We reached on sleighs, according to solar observations, eighty miles (English) inland, reckoned from the ice border, when the Lapps were sent forward 130 miles further, a distance fixed by their own judgment, which may be fully relied on. This was done because the deep, loose snow prevented us proceeding on sleighs, while it was eminently suitable for the "skidor," or snow "runners" (they are not "shoes") of the Lapps. We found no "ice-free" country, in fact the latter may, by this expedition, be fully proved not to exist, neither in this nor in any other latitude in Greenland. By the above-mentioned calculation, and estimating the shore-line at seventy miles inland, we have succeeded in reaching 280 miles into Greenland, which is more than half its width, while the Lapps, from their point of return, saw the land a good distance further east. The ice rose at the furthest spot reached to 7000 feet above the sea, and was still seen to rise to the east. The journey lasted a month.

THE PRESENT CONDITION OF FISH CULTURE

WITHIN the past few years the science of fish culture has made rapid progress, and radical changes have been made both in the apparatus and methods em-

ployed. Experience has enabled the fish-culturists to improve upon the old forms of hatching-boxes and troughs, while the propagation of additional species has necessitated the invention of new forms. The International Fisheries Exhibition, now in progress in London, has brought together valuable collections from the leading specialists of all parts of the world. A study of these enables one to form a very correct idea of the present condition of the science.

The subject is now sufficiently understood to warrant a division of the hatching apparatus into four classes: (1) apparatus for heavy eggs; (2) for semi-buoyant eggs; (3) for floating eggs; (4) for adhesive eggs.

Heavy eggs like those of the salmon and trout are hatched with little difficulty. An almost endless variety of apparatus intended for eggs of this class is exhibited, but it may all be referred to one of three divisions depending upon the direction of the current of water, namely, that with a horizontal current, that with an upward current, and that with a downward current. Apparatus of the kind first mentioned is most commonly employed, but that with an upward current has many points of superiority. Chief among these are economy of space, saving of water, and the prevention of injurious sedimentary deposits. In the United States, where, owing to the enormous quantity of eggs handled, economy of space is a necessity, the upward current is quite generally employed. A number of the American forms are provided with from ten to fifteen wire trays; these, when filled with eggs, are placed one above another, so that the entire volume of water must pass through each of them on its way through the compartment.

Semi-buoyant eggs, like those of the shad (*Alosa sapidissima*) and whitefish (*Coregonus clupeaformis*) require a treatment entirely different from those already mentioned, as their specific gravity is but slightly greater than that of fresh water, and they are easily carried about by the currents. The best results are obtained by directing an upward current against the eggs, thus producing a gentle but constant motion, and keeping them partially or wholly suspended in the water. As little attention is now given to hatching semi-buoyant eggs outside of the United States and Canada, the collections of these countries contain nearly everything of interest in this class. We find here various forms of floating boxes adapted to river currents, apparatus fed by water which is introduced under pressure through closed pipes, and mechanical apparatus requiring motive power. The first-named is admissible where the work is limited or where rigid economy is a necessity. The second is preferable in any city where hydrant water can be obtained or when the work is sufficiently extensive to warrant the use of a pumping-engine. The third is occasionally employed where large quantities of eggs are hatched, but it is more expensive than the one last named, and the results are usually less satisfactory. Apparatus of the second kind is ordinarily made of glass, its efficiency depending largely upon the motion imparted to the eggs and the position of the outflow through which the waste water and dead eggs escape. This opening in nearly all of the apparatus exhibited is placed at the top of the jar, and a current strong enough to carry off all of the dead eggs frequently carries many of the good ones with it, while the motion of those that remain is often so violent as to cause serious injury. An improvement in apparatus of this class has recently been made by Marshall McDonald of Washington, D.C. His apparatus consists of a closed jar having an outflow through a glass tube which passes into the interior of the jar, and can be raised or lowered at will. With this apparatus the dead eggs are easily removed by the slightest currents, and excellent results are obtained.

More difficulty is experienced in finding suitable apparatus for floating eggs, like those of the cod (*Gadus morhua*), than for any other class. Only five forms intended for floating eggs are exhibited. None of these